

ON *ELONA* (PULMONATA, ELONIDAE FAM. NOV.)

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ABSTRACT

The genus *Elona* Adams & Adams, 1855, is represented by 2 recent species, *E. quimperiana* (Férussac) and *E. pyrenaica* (Draparnaud), both living in SW Europe. However, while studying the genitalia of these species it became evident that they are clearly different from what is usual in the Helicidae. The mucous glands, inserting on the upper part of the vagina, are irregularly bulbous. There is a double-walled penis without papilla; the inner tube shows longitudinal ridges or papillae in the lumen. *Elona* obviously does not fit well in any of the known subfamilies or families. Therefore, a new family, Elonidae, is proposed.

E. quimperiana and *E. pyrenaica* differ in many characters of shell and genitalia. Evidently, however, they are more closely related to each other than to any other Recent pulmonate snail species, which should be recognized in the nomenclature. The relation to *Tropidomphalus* Pilsbry, 1895, known from the European Oligocene-Pliocene, remains unclear.

The name *Elona* has been introduced by Adams & Adams (1855: 211) as a nomen novum for *Sterna* Albers, 1850, non Linnaeus, 1758, a name proposed for a single pulmonate snail species, *E. quimperiana* (Férussac, 1821), known from Brittany and, separated from there by a 500 km gap, also from the northeastern Atlantic coastal area of Spain as far east as the extreme SW of France (Fig. 1). *E. quimperiana* differs conspicuously from all other western Palaeartic gastropods in shell shape (Figs. 2-5), somewhat resembling certain tropical Camaenidae, especially of the genus *Chloritis* Beck, 1837. The shell is thin and transparent, and has a strongly inflated last whorl and an immersed apex. The first ca. 1½ whorls show a regular pattern of spirally arranged elongated papillae, formed by the calcareous part of the shell and accentuated by periostracal, erect (usually deciduous) scales. On the following about 1½ whorls comparatively big and widely spaced round calcareous papillae are developed, forming the bases of ca. 0.15 mm long, thick periostracal hairs; additionally, many very fine periostracal papillae are found on this part of the shell. On the last whorls only an irregular radial sculpture is seen, with very fine, more or less obsolete spiral striae.

As early as 1855-1856, the brilliant French malacologist Moquin-Tandon published anatomical data on *E. quimperiana* as well as on many other gastropod species represented in France. He had discovered that *E. quimperiana* was not only aberrant in shell shape, but also in having club-shaped mucous glands instead of glands of the normal finger-like type. He also had found a 2nd species with similar mucous glands, known as *Helix pyrenaica* Draparnaud, 1805. This species, which is restricted to a small area in the eastern Pyrenees in France, Andorra and Spain (Fig. 1), strongly resembles certain representatives of the European Campylaeinae in shell shape (Figs. 4, 5). The shell is less thin than in *E. quimperiana*, the body-whorl is not strongly inflated and the apex is not immersed. The first ca. ¼ whorls show an irregular pattern of papillae and wrinkles. On the following ¼-½ whorls, irregular radial riblets become more obvious and vague, spirally elongated papillae are developed, most clearly on the part of the whorl adjoining the outer suture; on the opposite part, near the inner suture, the pattern of roundish papillae is continued, in some specimens as far as the aperture of the shell. Irregular radial riblets and very fine spiral striae are seen on the younger whorls; the striae may be obsolete or completely reduced on the body whorl. As all specimens studied were well "cleaned", additional periostracal structures have not been observed although these might be present.

Moquin-Tandon (1855-1856: 126) assigned *E. quimperiana* and *E. pyrenaica* to a *Helix*

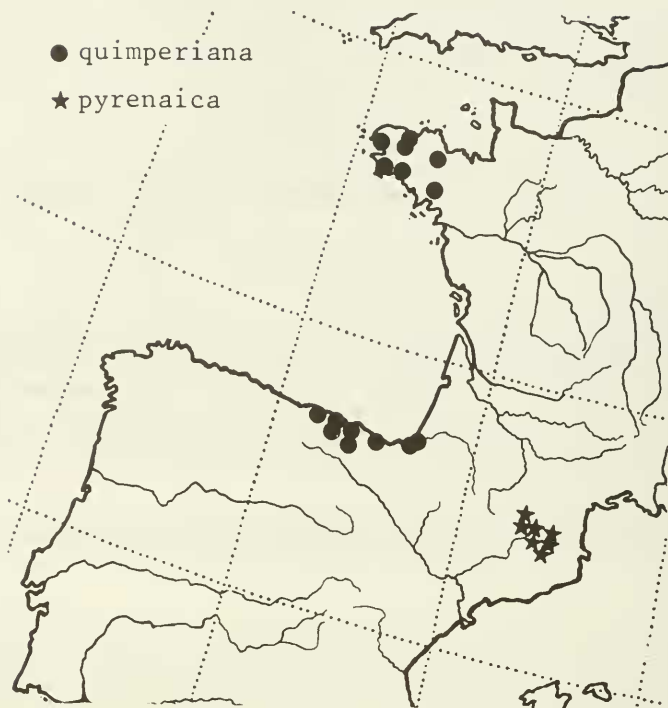
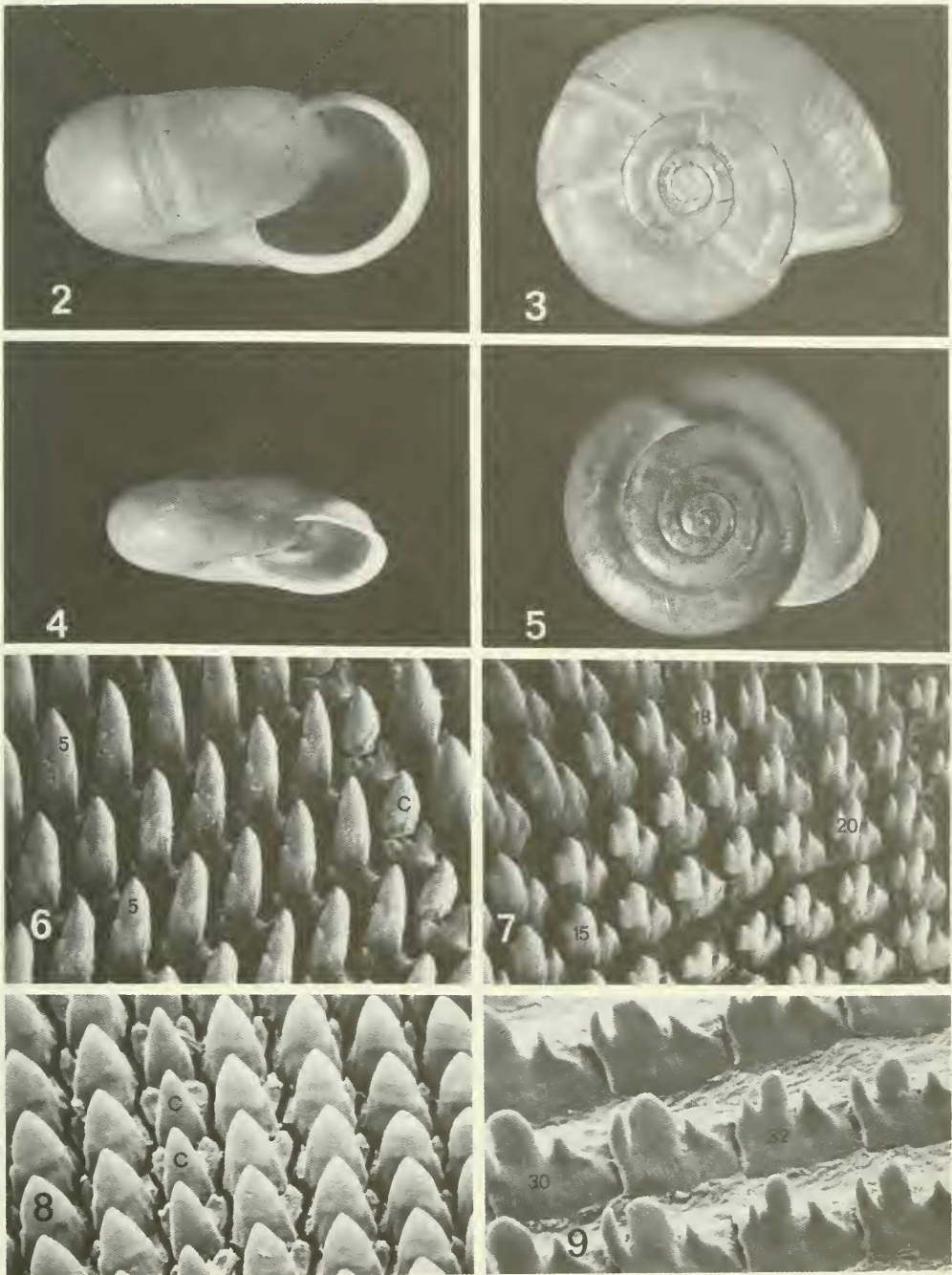


FIG. 1. Distribution of *Elona quimperiana* and *E. pyrenaica*, after Germain (1930: 229-230) and material present in the Rijksmuseum van Natuurlijke Historie, Leiden, Netherlands, and in the Senckenberg Museum, Frankfurt am Main, Germany.

subgenus of their own, characterized by the club-shaped mucous glands. He used the name *Corneola* Held, 1837, for this taxon, apparently overlooking that Gray (1847: 172) selected "*Helix cornea*" as type-species of *Corneola*, in conformity with the ICZN, as Held (1837: 912) listed "*cornea* Drap." under *Corneola*. *H. cornea* is assigned to *Chilostoma* Fitzinger, 1833, by Moquin-Tandon (1855-1856: 134). Later on Hesse (1885) restudied the genitalia of *E. quimperiana* and Ortiz de Zárate (1946: 337-340) did the same for *E. pyrenaica*. Hesse (1885: 4) emphasized the isolated position of *E. quimperiana*, stating that the species most certainly does not belong to *Campylaea* ("alles Andere . . . als eine *Campylaea*"); however, he could not suggest any alternative classification. Ortiz de Zárate (1946) confirmed the observations published by Moquin-Tandon (1855-1856) and gave some additional information. Zilch (1960: 700) classified *Elona* among the Campylæinae, Helicidae, as had been done by Germain (1930: 228), which author only used a different name, Helicigoninae, for the subfamily; Pilsbry (1895: 307) considered *Elona* even a subgenus of *Helicigona* Férussac, 1821.

The present paper deals with two main questions: (1) should *E. quimperiana* and *E. pyrenaica* be considered congeneric or not, (2) are these 2 species only aberrant amidst the many representatives of the Helicidae by the shape of the mucous glands, or are they both different in other characters as well.

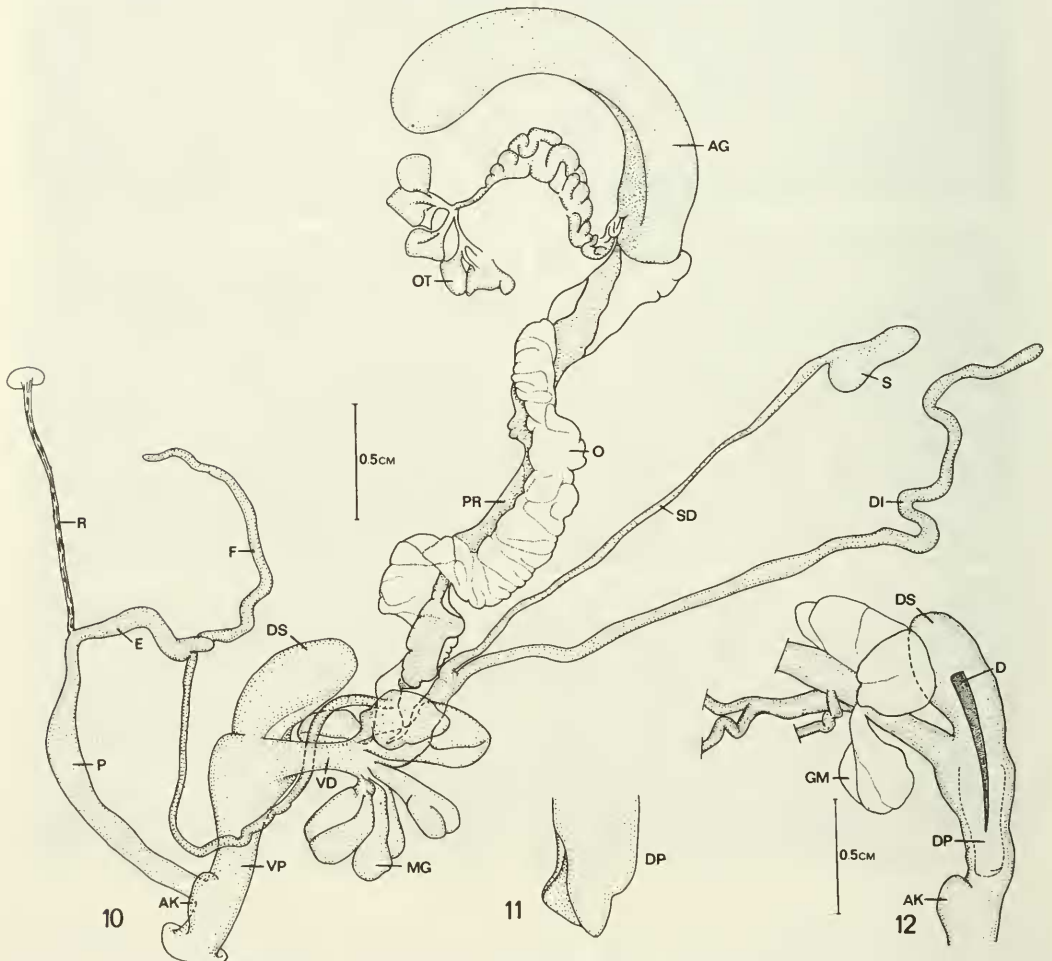
The conspicuous differences in shell shape and structure have been mentioned above. The genitalia of *E. quimperiana* and *E. pyrenaica* are clearly different as well. In *E. quimperiana* (Figs. 10-13) the genital atrium has a thick muscular knob (AK). The vagina consists of a broad proximal part (VP) bearing a large dart sac (DS) with a long and slender dart (D) inside, and a more slender distal part (VD) around which the about six club-shaped mucous glands (MG) insert. In the thick proximal vagina there is a conspicuous dart papilla (DP). The receptaculum seminis has a diverticulum (DI) which is longer than the spermatheca (S) and its duct (SD)



FIGS. 2, 3. *Elona quimperiana*, Spain, Santander, Ramales, Español leg.; width 26.8 mm (RMNH, Leiden). FIGS. 4, 5. *Elona pyrenaica*, Spain, Gerona, Rialp, Queralps, C. Altimira leg.; width 21.1 mm (RMNH, Leiden). FIGS. 6, 7. *Elona quimperiana*, details of the radula (numbers of teeth indicated), France, Finistère, between Berrien and Scrignac (SE of Morlaix), J. P. M. Clerx leg.; 6, X550; 7, X525. FIGS. 8, 9. *Elona pyrenaica*, details of the radula (numbers of the teeth indicated), France, Pyrénées-Orientales, Villefranche-de-Conflent, D. Aten leg.; 8, X600; 9, X1275.

together. The penis (P) is slightly longer than the flagellum (F) and more than twice as long as the epiphallus (E). The flagellum is widest at its base. From its insertion on the genital atrium about 4/5 of the penis is double-walled. The inner tube is subdivided from proximal to distal in 3 parts according to the surface structure of its lumen, which consists of a few irregular longitudinal ridges, many fine papillae and a few longitudinal ridges, respectively. There is no penis papilla. On Fig. 10 the albumen gland (AG), the oviduct (O), the ovotestis (OT), the prostate (PR) and the retractor muscle (R) of the penis, which do not show special characters, are indicated as well.

In *E. pyrenaica* (Figs. 14, 15) the genital atrium (A) has no knob. The distal part of the vagina (VD) has a very thick wall and is, therefore, as thick as the proximal part (VP). The club-shaped mucous glands (MG) have shorter stalks (ducts). A dart papilla is absent and the small dart sac (DS) contains a very short dart (D) with a broad base. Externally the male part of the genitalia differs from that of *E. quimperiana* in the very long flagellum (F), which is more than twice as long as the penis (P), and the epiphallus (E) which equals the penis in length. The flagellum is broadest at about the middle of its distal half. The double-walled part of the penis, comprising 4/5 of its total length, ends at the insertion of the penis retractor. Therefore, in contrast to what is found in *E. quimperiana*, the most proximal part of the penis



FIGS. 10-12. *Elona quimperiana*, France, Finistère, between Berrien and Scignac (SE of Morlaix), J. P. M. Clerx leg. (RMNH, Leiden); 10, genitalia; 11, detail of the dart papilla; 12, detail showing the position of dart papilla and dart.

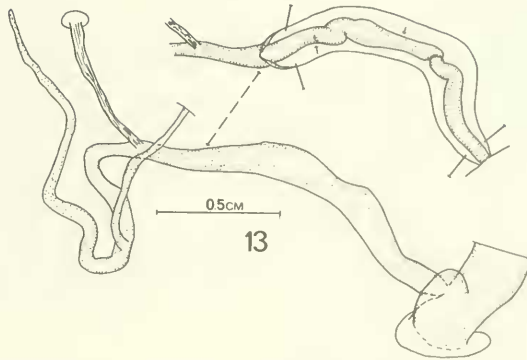


FIG. 13. *Elona quimperiana*, specimen of Figs. 10-12, detail illustrating the position of the inner tube of the penis, with arrows indicating where its 3 parts end (see also the text).

is simple. The inner tube can be subdivided in only 2 parts, the most proximal one with papillae, which are less small than in *E. quimperiana*, and the distal part with some longitudinal ridges. A penis papilla is also absent in *E. pyrenaica*. There are no conspicuous differences in the shape of the receptaculum seminis; the diverticulum may be swollen at the end (Fig. 14).

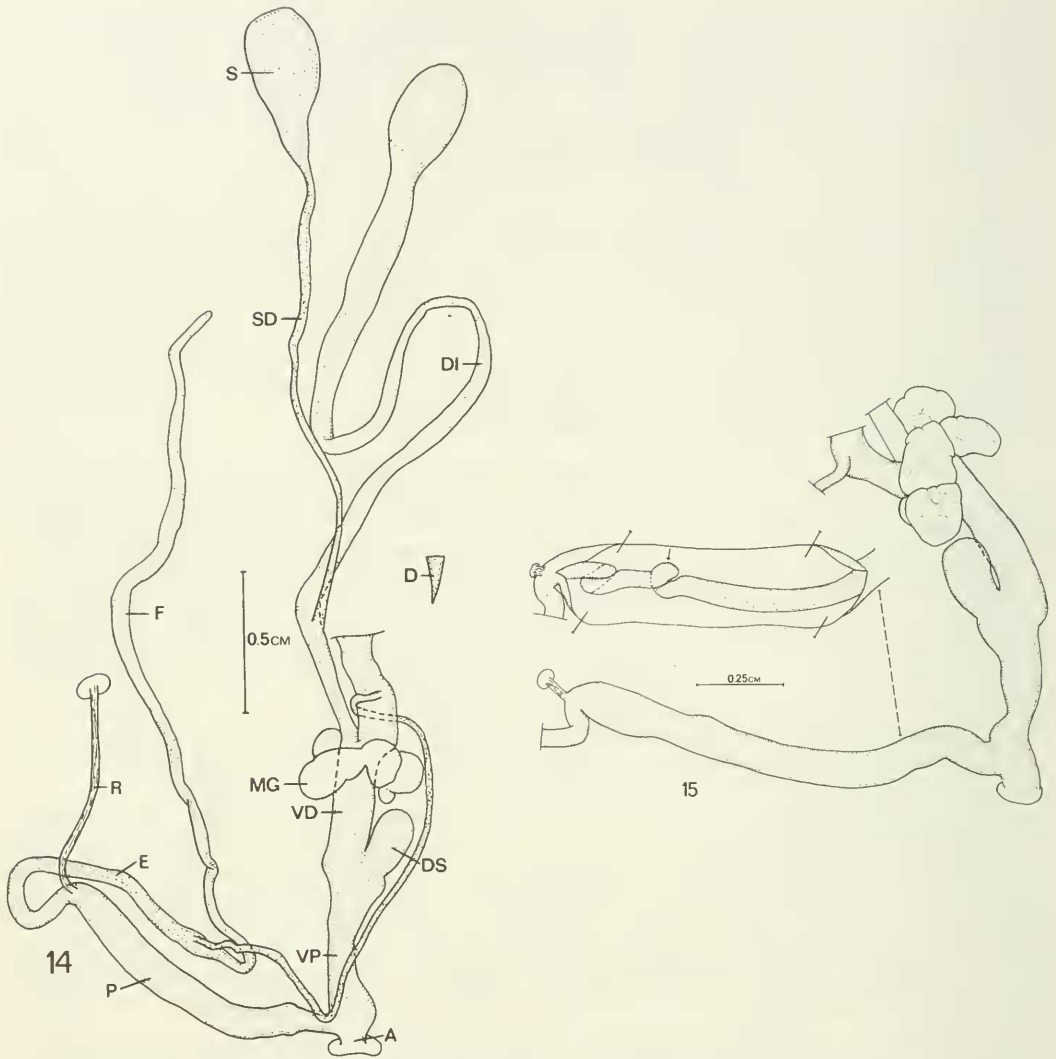
In both *E. quimperiana* and *E. pyrenaica* the right eye retractor muscle passes between penis and vagina. The foot-sole is not subdivided in the first species; this character could not be investigated in the other taxon. In *E. quimperiana* the mantle shows irregular dark spots, visible through the transparent shell, and, therefore, causing a kind of mimicry as seen independently in various groups of gastropods (cf. e.g. Van Bruggen, 1978: 900, Fig. 10). On the mantle of *E. pyrenaica*, which has an opaque shell, no dark spots were observed.

Both species have an odontognathous mandibula. The radulae (Figs. 6-9) are similar. The same type of teeth are seen in *E. quimperiana* and *E. pyrenaica*, in which the formulae $C + 50$ (after one specimen) and $C + 45-47$ (after 2 specimens) were found respectively.

Summarizing we may say that *E. quimperiana* and *E. pyrenaica* not only differ clearly in shell shape and microsculpture, but also in the morphology of the genitalia. The relative measurements of many parts are very different in both species. Some structures are found in only one of the 2 (atrial knob, dart papilla), others show obvious differences in shape (e.g. flagellum, dart, inner surface of the inner penial tube). However, *E. quimperiana* and *E. pyrenaica* are more closely related to each other than to any other western Palaeartic gastropod species known at present. I prefer to demonstrate this relationship in nomenclature, rather than to emphasize the many structural differences by introducing a new genus or subgenus name.

Obviously, *Elona* cannot be assigned to the Campylaeinae, which are characterized by a completely different type of genitalia (e.g. Knipper, 1939). A double-walled penis as seen in certain Helminthoglyptidae (e.g. Pilsbry, 1939: 67), and mucous glands as in Bradybaenidae (e.g. Pilsbry, 1895: xxxvi), inserting, however, on the vagina as in Helicidae, make the classification of *Elona* difficult. Therefore, a new family, Elonidae, is proposed, with some hesitation, as much research on the higher pulmonate taxa still has to be done.

One could pose the question whether fossil representatives of the Elonidae are known. Unfortunately, as we have seen before, these might not be clearly distinguishable from the Campylaeinae, as only shell characters will be available. Schlickum & Strauch (1972: 79, fig. 4) described *Elona kowalczyki* from the German Upper Pliocene based on a single damaged shell, without giving details on the microsculpture. Judging from the description and figure only, it remains obscure to me why these authors suppose that this species does not belong to *Tropidomphalus* Pilsbry, 1895. In fact, it would be most interesting to know how the representatives of this genus, known from the Oligocene to the Pliocene in Europe, differ from the *Elona* species. Judging from Zilch (1960: 699-700, figs. 2434, 2435) the *Tropidomphalus* species bridge the gap between *E. quimperiana* and *E. pyrenaica*, at least in shell shape. Here we find another argument against creating a separate genus or subgenus for *E. pyrenaica* at this moment.



FIGS. 14, 15. *Elona pyrenaica*, France, Pyrénées-Orientales, Villefranche-de-Conflent, D. Aten leg. (RMNH, Leiden); 14, genitalia and dart; 15, detail illustrating the position of the inner tube of the penis, with an arrow indicating the transition between its 2 parts (see also the text).

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